Volunteer Lake Assessment Program Individual Lake Reports

MOUNTAIN LAKE, LOWER, HAVERHILL, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	2,318	**Max. Depth (m):**	9	**Flushing Rate (yr^{-1})**	4.1
Surface Area (Ac.):	60	**Mean Depth (m):**	3.8	**P Retention Coef:**	0.5
Shore Length (m):	2,000	**Volume (m^3):**	917,000	**Elevation (ft):**	774

TROPHIC CLASSIFICATION

Year	Trophic class
1991	OLIGOTROPHIC
2006	OLIGOTROPHIC

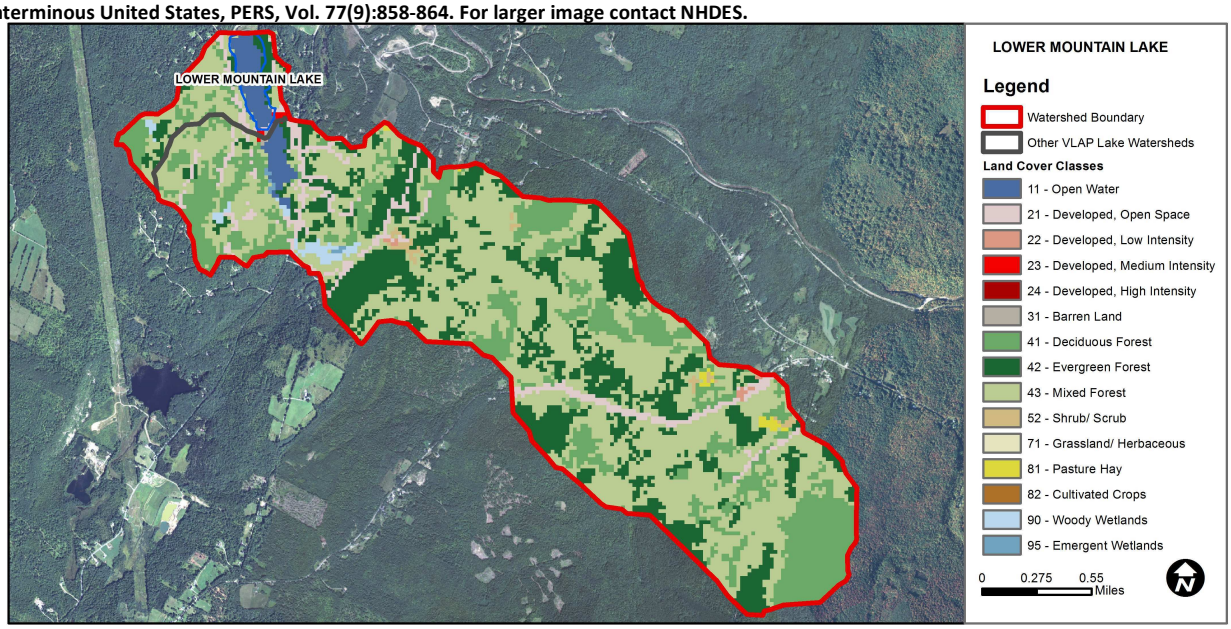
KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	The calculated median is from 5 or more samples and is > indicator and the chlorophyll a indicator is exceeded.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Very Good	There are a total of at least 10 samples with 0 exceedances of criteria.
	Dissolved oxygen satura	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Chlorophyll-a	Slightly Bad	The calculated median is from 5 or more samples and is > indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	2.4	Barren Land	0.05	Grassland/Herbaceous	0
Developed-Open Space	4.95	Deciduous Forest	21.32	Pasture Hay	0.33
Developed-Low Intensity	0.17	Evergreen Forest	22.51	Cultivated Crops	0
Developed-Medium Intensity	0.13	Mixed Forest	46.42	Woody Wetlands	0.78
Developed-High Intensity	0	Shrub-Scrub	0.55	Emergent Wetlands	0.12

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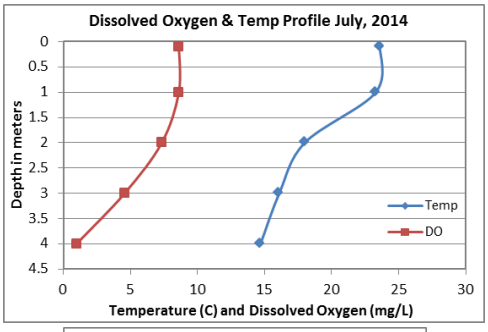
Mountain Lake, South, Haverhill

2014 Data Summary

Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were elevated and approached levels indicative of an algal bloom (15 ug/L). Chlorophyll levels increased again in 2014, were much greater than the state median, and were the highest measured since monitoring began. Historical trend analysis indicates highly variable chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Deep spot and Monteau Inlet conductivity levels remained slightly elevated and greater than the state median. Historical trend analysis indicates relatively stable epilimnetic (upper water layer) conductivity since monitoring began.
- **E. coli:** Beach and Cove E. coli levels were much less than the state standard of 88 cts/100 mL for public beaches and 406 cts/100 mL for surface waters.
- **Total Phosphorus:** Epilimnetic and Hypolimnetic (lower water layer) phosphorus levels were slightly below average in 2014 and were less than the state median. Historical trend analysis indicates highly variable epilimnetic phosphorus levels since monitoring began. Monteau Inlet phosphorus levels were low and within an average range for that station.
- **Transparency:** Transparency measured without the viewscope (NVS) was below average and much less than (worse) the state median. The elevated algal growth likely contributed to the low transparency. Historical trend analysis indicates highly variable transparency since monitoring began. Transparency measured with the viewscope (VS) was slightly better than that measured without but remained below average, once again likely due to the elevated algal growth.
- **Turbidity:** Deep spot and Monteau Inlet turbidities were all slightly elevated and above average for those stations.
- **pH:** Epilimnetic and Monteau Inlet pH were within the desirable range 6.5-8.0 units, however Hypolimnetic pH was less than desirable. Historical trend analysis indicates highly variable epilimentic pH since monitoring began.
- **Recommended Actions:** Increase monitoring frequency to once per month during the summer to better assess seasonal and historical water quality trend and decrease data variability. Epilimnetic phosphorus has been highly variable since 2002 and spikes to elevated levels frequently. Transparency has generally remained below average since 2006, and chlorophyll levels have remained elevated since 2012. This generally indicates water quality is getting worse. The increased frequency and intensity of storm events highlights the importance of managing stormwater runoff in the watershed. Stormwater runoff can transport nutrients necessary for algal growth , and sediments to the lake. Educate lake and watershed residents on ways to reduce stormwater runoff from their properties, dirt/gravel roads and steep slopes. DES' "NH Homeowner's Guide to Stormwater Management is a great resource.



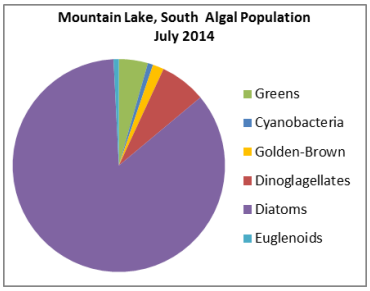


Table 1. 2014 Average Water Quality Data for MOUNTAIN LAKE, SOUTH

Station Name	Alk. mg/l	Chlor-a ug/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
						NVS	VS		
Epilimnion	11.2	11.97	81.1		10	1.80	2.20	2.55	7.02
Hypolimnion			85.7		11			4.06	6.39
Beach				12					
Cove				10					
Monteau Inlet			85.4		8			1.76	7.01

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data moderately variable.	Chlorophyll-a	Stable	Trend not significant; data highly variable.
pH (epilimnion)	Stable	Trend not significant; data highly variable.	Transparency	Stable	Trend not significant; data highly variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data highly variable.